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BLUETOOTH DEVICES IN EVERYDAY LIFE

Abstract. *The article considers modern popular Bluetooth devices. The devices under consideration can be used in everyday life. Such devices as headphones, door lock, smart clocks, fitness bracelet and Bluetooth headset were considered. The concept of designing a smart home using Bluetooth technology was also considered.*

Keywords: *Wireless technology, Bluetooth, Bluetooth device, Internet of Things, smart home.*

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BLUETOOTH УСТРОЙСТВА В ПОВСЕДНЕВНОЙ ЖИЗНИ

Аннотация: *В статье рассматриваются современные популярные Bluetooth-устройства. Рассматриваемые устройства могут применяться в повседневной жизни человека. Были рассмотрены такие устройства, как наушники, дверной замок, смарт-часы, фитнес-браслет и Bluetooth-гарнитура. Также рассмотрена концепция создания умного дома при использовании технологии Bluetooth.*

Ключевые слова: Беспроводная технология, Bluetooth, Bluetooth-устройства, Интернет вещей, умный дом.

Introduction

Bluetooth is a standard wireless technology used to exchange data between devices over short distances, using the frequency range of 2.402 GHz to 2.480 GHz or 2.400 and 2.4835 GHz, as well as to provide personal networks (PANs). Bluetooth uses a radio technology called frequency-hopping spread spectrum [1].

Work on Bluetooth began in 1994 by telecommunications equipment manufacturer Ericsson as a wireless alternative to cables. Now Bluetooth is managed by the Bluetooth Special Interest Group (SIG). The Bluetooth SIG has developed the specification, manages the qualification program.

Bluetooth is known to provide information exchange between devices. In today's world, Bluetooth enables the exchange of data not only between computers and phones, but also between other devices, which will be considered later in this article.

Devices used in everyday life

Let us consider the devices that can be used every day, for example, a lock for the front door. It is installed just like a usual lock. For the electronic lock, there is a special application that allows you to block or unblock the door from your phone. And there is also the possibility of automatic opening the lock, if you approach it with your phone, which has Bluetooth enabled. Figure 1 - *Bluetooth lock for entrance door* shows the lock that uses Bluetooth.



Figure 1 - Bluetooth lock for entrance door

Also, let us consider one of the most popular devices that uses Bluetooth, this is a headset for your phone. Pairing it with the device does not require any additional applications, it is enough to have Bluetooth enabled on your phone. The headset is used to avoid holding your phone permanently in the hands while you are talking. It enables you to receive calls, transmits sound quality, securely fixed in the ear, it often has a function of effective noise reduction. Active Noise Cancellation System (ANC) cuts off all unnecessary sounds during a conversation, so your voice sounds clear. These devices remain popular today because of their low power consumption and small size. Figure 2 shows one of the popular Bluetooth headset models.

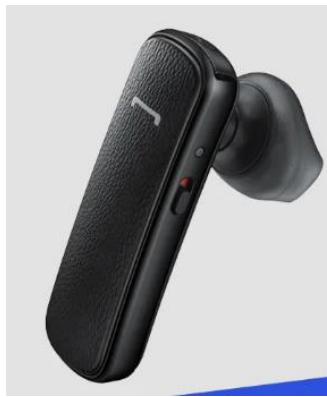


Figure 7 - Bluetooth headset

Nowadays, Bluetooth headphones are very popular. They can connect to both the phone and the computer. To pair with the device does not require additional applications, it is enough to have Bluetooth enabled. They have the same high quality sound as wired, but give full freedom of movement. Therefore, there are no problems associated with the presence of wires in the headphones, such as constant untangling headphones, breakage associated with broken wires. What is related to freedom of movement while using them, you can exercise freely and even swim if they are waterproof. Figure 3 shows one of the popular models of Bluetooth headphones.



Figure 3 – Bluetooth headphones

Other popular devices are smart watches and fitness bracelets. These devices allow you to monitor your activity during the day. They also have a workout function, thus tracking your heart rate, speed and time of exercise, the number of calories burned. Many smart watches and fitness bracelets are waterproof, so you can exercise and monitor your swimming activity.

They also keep track of your sleep, its duration when you wake up, the phases of slow and fast dreams. Thanks to this, these devices can help you plan and follow the regime.

Due to the coronavirus pandemic, a feature has been added to some smart clocks that determines when you wash your hands. It includes a timer for 20 seconds, showing you the recommended duration. They may also remind you to wash your hands when you come home.

Also in some devices it is possible to remove the ECG (Electrocardiogram), which reads the duration and strength of electrical signals that occur during the heartbeat.

To synchronize the data that the bracelet removes, you need to install a special application on your smartphone, which connects the smartphone and smart watch or fitness bracelet. The application will display an analysis of your activities.

Figure 4 shows some of the popular smart watch and fitness bracelet models.



Figure 4 - Fitness bracelets and smart watches

Other popular devices are wireless keyboards and mice for computers. They are powered by ordinary lithium batteries. To connect them to a computer you need a special Bluetooth adapter (connects to the computer via USB), as usually stationary computers do not have a Bluetooth module. Usually such adapters are included with the mouse and keyboard. These devices help remove the wires that go from your computer to your mouse and keyboard. Figure 5 shows these devices.



Figure 5 - Wireless keyboards and mice

Smart home and bluetooth

Recently, such trends as the Internet of Things have been actively developing.

Internet of Things - the concept of a computing network of physical objects («things»), equipped with built-in technologies for interaction with each other or with the external environment. This technology implies the creation of «smart homes», thus, household appliances, lighting fixtures, thermostats, home security systems create their own ecosystem [2]. This ecosystem can be controlled with a smartphone or smart speakers.

One technology that allows you to share devices with each other is Bluetooth. Typically, to create a smart home, you use Bluetooth gateways that communicate with

a sensor or device via Bluetooth, and communicate with the cloud via Wi-Fi [3]. Such a scheme is shown in Figure 6.

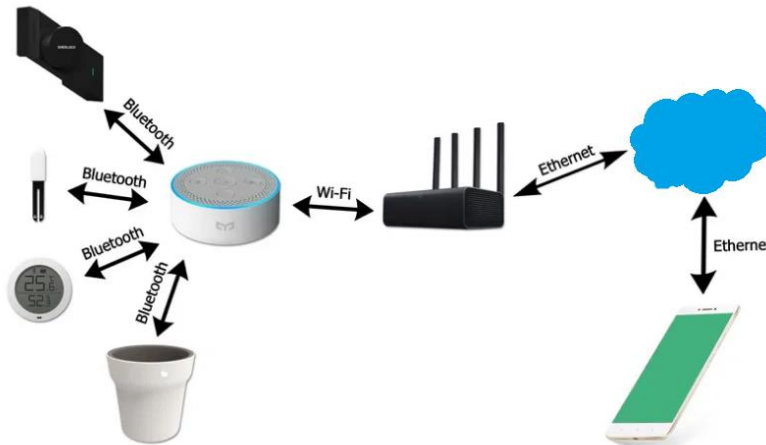


Figure 6 - Scheme of information exchange in a smart home

Devices that exist on the market and that are used in a smart home:

- CCTV camera,
- A smart speaker (a voice assistant, or the ability to control a smart home with voice commands),
- nightlight,
- luminaire,
- air humidifier,
- air quality analyser (temperature, humidity),
- alarm clock,
- socket (with Bluetooth-gateway function),
- plant condition monitoring sensor,
- door lock, etc.

Conclusion

In this article we have considered popular Bluetooth devices, which a person can use in everyday life. Also, we have touched upon the concept of smart home, where the devices exchange information with each other via Bluetooth.

For more than 20 years Bluetooth has been developing and it enables to exchange information among a large number of devices, from a computer keyboard and mouse to the analyzer of an air quality in the room.

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